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Working Together to Build a Better Environment Plowed Terracing Technique to Reduce Erosion from Wave Impacts



"... It is our goal to provide an environmentally sound transportation network and protect, preserve, and enhance Louisiana's cultural and natural resources, many of which are unique to our State. We will ensure that transportation and water resource projects are compatible with environmental concerns and considerations, and done in the spirit of cooperation with our public and private partners through information sharing and mutual involvement..."

- Louisiana Department of Transportation and Development

The Louisiana Department of Transportation and Development (LADOTD) Environmental team continuously measures up by applying ingenious ways to protect wetlands throughout their state. On a per-acre basis, Louisiana's marshlands are as biologically productive as a tropical rain forest. In 1991, the LADOTD successfully used an "End-on" construction method to extend Interstate 310 across a wetland (southern swamp near New Orleans) by building nearly two miles of twin elevated highways with very little ground disturbance. It was no easy task.

End-on construction is literally a "top-down" technique. Rather than the traditional operation of placing



A Cameron Parish Police Jury employee unloading a boat for an inspection group.

heavy equipment on the ground-- most of the work is done from work platforms that become the leading edge of the new road surface that is mounted atop concrete piles. From these platforms, a crane holds the piles as they are driven. This process pushes the bridge viaducts forward one bay at a time. Once a bay is completed, the crane "crawls" forward onto the next work platform to repeat the cycle. This technique is currently being used for special projects in other states.

Recently, a network of agencies and partners joined forces for a somewhat less prominent task, but one that may not have been as successful if it were undertaken by one agency, alone. The Cameron Parish Police Jury, along with the LADOTD and the Federal Highway Administration (FHWA) - Louisiana Division, worked in a

partnership to mitigate transportation impacts by saving an eroding coastal marsh area near Louisiana Highway

Project Partners

- Cameron Parish Police Jury
- Ducks Unlimited
- Federal Highway Administration
- Louisiana Department of Natural Resources
- Louisiana Department of Transportation and Development
- Miami Corporation
- North American Land Co.
- North American Waterfowl
- Shell Oil Company
- U. S. Army Corps of Engineers
- U. S. Fish and Wildlife Service

27 (LA 27). This route is used as one of the state's emergency coastal

-continued inside



Closeup of new plowed terrace after one season growth.

evacuation routes in the event of approaching major storms. The project would involve providing new shoulders for LA 27. To do this the existing ditches, containing wetlands, would have to be displaced.

As required by law, the network of regulatory agencies wanted suitable compensatory mitigation for these impacts, and LADOTD and FHWA wanted to achieve impact mitigation that would provide the greatest value for the public's transportation investment. Working as a partnership, they identified the need to stem erosive forces to prevent the loss of nearby marshlands.

It was determined that the nearby marsh area of a coastal wildlife refuge was suffering deterioration from wave energy that also drives waters with increased salinity. The combined effect was killing vegetation that stabilizes the marsh's deposited soils, and then scouring the saturated and shallow-water landforms. Because this marsh area was in close proximity to LA 27, LADOTD expressed an interest in providing a solution after hearing local concerns from the Cameron Parish Police Jury. After several meetings and site visits, in early spring of 2002, LADOTD, assisted by the FHWA-Louisiana Division and the

partnership, agreed to an innovative remedial solution. Having explored alternatives techniques, the conclusion was to create energy-absorbing plowed terraces. This plowed terracing was installed on the East Cove Unit of the Cameron Parish National Wildlife Refuge as mitigation for wetlands impacts caused by the improvements to nearby LA 27. This mitigative plowed terracing was part



"This project serves as a highly visible example of proactive environmental stewardship by the FHWA Louisiana Division office and the LADOTD. Not only has this project showcased the use of cutting edge science and technology in ecosystem/habitat conservation, but demonstrates how highway agencies in partnership with other Federal, state, and local agencies can mitigate project impacts with flexible, regional approaches, rather than site-specific mitigation plans that are often more costly and less environmentally valuable."

- William A. Sussmann, Louisiana Division Administrator, FHWA

"This project is an example of how public agencies and private groups can work together for the benefit of all. The resulting collaboration yielded a better result for the money spent than a multitude of smaller projects individually pursued for the same money. The ultimate winner is Louisiana. We are delighted we had the opportunity to participate in this project."



-- Kam K. Movassaghi, Ph.D., P.E.
Transportation Secretary, LADOTD

of a larger plowed terracing project occurring in Cameron Parish on both publicly and privately owned lands.

Composed of heavy dredged clay with low erodability, these plowed terraces essentially involved the creation of low row-shaped mounds "plowed" or dredged by a bucket on a marsh buggy to a nominal height just above the mean water elevation and then planted with salt grass along the water line.

Once established, the plantings quickly fill in the remaining space. (Although this is not an entirely new technique, it was still considered experimental when negotiations started to implement this mitigation in the state of Louisiana.) What was once considered an experimental process a few years back has now proven to be an effective and valuable conservation technique.

Successful wetland mitigation is often hard to come by and usually becomes very expensive. In some situations, plowed terracing is a technique for coastal wetland and infrastructure protection that can effectively be used to mitigate both project impacts, as well as sometimes-destructive natural forces.

In October 2002, the partnership inspected the plowed terracing installed during the previous spring. After the first season of growth:

- **With only one exception, all constructed terraces viewed appeared to have healthy and vigorous plantings.**
- **Older terraces viewed in the same area were fully vegetated.**

This successful terracing installation is projected to help decrease deterioration of the nearby coastal marsh and will improve the quality of life for the inhabitants of both the wildlife refuge and Cameron Parish.


These terraces provide additional vegetated ground in open water areas, but more importantly, they serve to break the wave energy and while sustaining and increasing the supply of aquatic vegetation. They were place

in a strategic way that would help lessen the impact of wind-driven waves. The terracing should also increase the habitat diversity of the area in helping the development of underwater topography that improves local fisheries. The US Fish and Wildlife was very pleased with this technique and is proud to be a part of the partnership and this innovative conservation initiative. Ducks Unlimited oversaw the successful contracting work of installing the terraces.



These photos show the calming effect the vegetated strips have on the water surface as they buffer the erosive effects of wind and wave. This calming action is easily observed even though water elevation at the time of the photos was six inches above normal.





"Coming together on any project can always improve your chances for success. If you are willing to collaborate and work together, you can improve your time, maximize resources, reduce cost and achieve greater results. I'm pleased to say we did just that."

*- Glenn Harris, Refuge Manager US Fish & Wildlife Service,
Cameron Prairie National Wildlife Refuge and East Cove Unit*

The innovative techniques of this mitigation project pale in comparison with the exceptional cooperative effort that was driven by the interests of the partner agencies. The partners all agree that the project flowed much easier and allowed all to share in the cost and expertise for a value-added outcome. The partners learned that

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Editor

Timothy Barkley

Marketing Technology Specialist

404.562.3732

timothy.barkley@fhwa.dot.gov

Contributing Writer

Alexander Levy

Ecologist

404.562.562-3920

Alex.Levy@fhwa.dot.gov

The Resource Center - Atlanta provides technical services to transportation partners and customers throughout the Nation.

For Support and Services:

FHWA RESOURCE CENTER-ATLANTA

Suite 17T26

61 Forsyth Street, SW

Atlanta, Georgia 30303-3104

Hours of Duty: 7:30-4:00 EST

Telephone: **404.562.3570**

www.fhwa.dot.gov/resourcecenters/southern

when agencies share information and reach for a common set of objectives, an extra level of effort comes naturally that results in greater outcomes.

The most difficult part of the experience was working through the legal and administrative agreements. Accomplishing this administrative coordination means that future cooperative efforts will have a successful model already in place.

Because this is the result of several groups working together to maximize their resources, the LADOTD environmental project is hailed as a success. This networking has helped all partners realize that the value of coming together benefits both the

interests of individual agencies and, ultimately, the interest of the public we all serve. ●

For more information, please contact:

*Michele Deshotels, Executive
Management Officer 2, LADOTD
(225) 379-1226 or (225) 248-4190*

*Robert Mahoney
Environmental Specialist
FHWA - Louisiana Division
225-757-7624*

*Glenn Harris, Refuge Manager,
U. S. Fish & Wildlife Service
337-598-2216*

*Tina Horn, Cameron Parish
Administrator,
337-775-5718 ext. 115*